(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 1 010 730 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
21.06.2000 Bulletin 2000/25

(51) Int. Cl.[7]: **C08L 97/02**, C09D 197/02, C09D 201/00

(21) Application number: **98830765.8**

(22) Date of filing: **17.12.1998**

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE
Designated Extension States:
AL LT LV MK RO SI

(71) Applicant: **Valenti, Impero**
47100 Forli' Fo (IT)

(72) Inventor: **Valenti, Impero**
47100 Forli' Fo (IT)

(74) Representative: **Lanzoni, Luciano**
c/o BUGNION S.p.A.
Via Cairoli, 107
47900 Rimini (Forli) (IT)

(54) Wood flour-based fluid composition for coating, insulating and/or filling and method of application

(57) A wood flour based fluid compound, for coating, insulating, filling surfaces, with low compound thickness, in particular comprising: - wood flour introduced in a percentage ranging between 15% and 25%; - water introduced in a percentage ranging between 15% and 25%; - resin introduced in a percentage ranging between 15% and 25%; - inert materials introduced in a percentage ranging between 1% and 4%; - cellulose solution introduced in a percentage ranging between 28% and 33%; - fire-retardant materials introduced in a percentage ranging between 3.5% and 6%; - solvent introduced in a percentage ranging between 1% and 3%; all with the preliminary application, on the surface to be treated, of acrylic or polyurethane adhesive and the subsequent application of an external filler, after the desiccation of the compound.

EP 1 010 730 A1

Description

[0001] The present invention relates to a wood flour-based fluid compound, for coating, insulating and/or filling surfaces with low compound thickness and to a method for the application of the compound.

[0002] As is well known, whenever it is necessary to renovate surfaces of artefacts in general, in order to restore their functionality or aesthetic appearance, or to insulate the surface to be treated from the thermal, acoustic, electrical or even hygienic point of view, several different materials are used, depending on the case, whereof all however entail negative aspects, due in some cases to the intrinsic costs and/or the costs of the necessary labour, which are not always moderate, in other cases to the inevitable tendency of the material used to alter over time. For example, it is known that in the past the so-called, and well known, "Eternit" was used to form covers such as roofs and penthouses, thanks to its great resistance to wear and weather. However, ever since it was noted that this material is harmful to health, due to the glass micro-fibres its releases, it has become necessary to replace it or render it harmless. In the first case, rather significant problems exist with the disposal of this harmful material. If instead the material were to be rendered harmless, it would be possible to pour, over the roof, a new layer of concrete lightened with clay or polyurethane foam, and then lay a new tile roof. Obviously, this solution entails non negligible costs. Another, more economical, solution provides for coating the roof with particular resins, able to prevent the release of the aforesaid micro-fibres. In this latter case, however, it must be noted that, with thermal expansion, such resins crack, progressively losing their effectiveness, as they flake. Other surfaces that notoriously require maintenance are those made of wood, which are, in many cases, treated periodically with paints which, also in this case, can lose their homogeneity due to the strong thermal expansion of wood.

[0003] Also masonry surfaces to be retouched present the same disadvantages indicated above. The aim of the present invention is to make available an easily applied fluid compound, which eliminates all the aforesaid drawbacks.

[0004] The subject invention is a fluid compound, able to be painted, based on extremely fine wood particles (wood flour), which easily and economically allows the aforesaid applications. The high wood content allows to obtain an insulating and heat-deformable material, hence one that follows any thermal excursions without any problems, being also a mostly natural material.

[0005] Moreover the subject compound, although wood-based, is very advantageously fire retardant and thus not flammable.

[0006] The invention, being able to be applied by spraying, can be laid in very thin layers, depending on the envisioned use.

[0007] Such a compound can also easily be applied, after using bonding agents and with the subsequent treatment with fillers, of the kind commonly usable for wood and it is also waterproof and impervious to moulds, without being subject to colour changes or other alterations.

[0008] Lastly, such a compound can be realised with water percentages which can be varied depending on the final use whereto the compound is destined. The compound can be rather thick, in which case it can be used also as filler or spread with stopping knife means and the like, or also rather liquid, when it is used substantially as a common dense paint, with high thickness.

[0009] Further features and advantages of the invention shall become more readily apparent from the detailed description that follows.

[0010] The subject fluid compound essentially comprises the following components:

- wood flour;
- water;
- resin;
- inert materials;
- a cellulose solution.

[0011] In order to render the material non flammable, in spite of the abundant presence of wood, it preferably comprises also fire-retardant materials and solvent.

[0012] More specifically, the compound comprises:

- wood flour introduced in a percentage ranging between 15% and 17%;
- water introduced in a percentage ranging between 15% and 25%;
- resin introduced in a percentage ranging between 15% and 25%;
- inert materials introduced in a percentage ranging between 1% and 4%;
- cellulose solution introduced in a percentage ranging between 28% and 33%;
- fire-retardant materials introduced in a percentage ranging between 3.5% and 6%;
- solvent introduced in a percentage ranging between 1% and 3%.

[0013] The wood flour used in the subject compound is in particular made with royal beech, with grain size ranging between 75 micron and 150 micron. Nevertheless, although wood flour in itself is not particularly costly, it could even more economically be waste flour, as long as it has the aforesaid grain size. The resin is chosen among thermoplastic materials, such as vinyl resin, to provide the compound with the best possible thermoplasticity, and it is stabilised. In particular it is a water dilutable vinyl-acrylic copolymer desiccating in air, with high chlorine content, stabilised in its molecule, to render the compound particularly suitable for the formu-

lation of fire-retardant products, as in the case at hand.

[0014] The inert materials, useful for th optimal success of the compound, comprise for instanc kaolin and at least a natural mineral charge based on silica, carbonates, magnesium and manganese, obtainable from powder made with diatoms (particular shells). It is available on the market as CELITE 281. The latter component is particularly interesting, because it is rather spongy and thus easily absorbs liquid for a good success of the compound, but it also easily makes the liquid components volatilise during the desiccation process, after the application of the compounds.

[0015] An essential component is constituted by the cellulose solution, which is a solution of water-soluble polymers (cellulose ethers) and it is used to suspend, stabilise, thicken aqueous systems. It also allows the controlled release of water, very useful progressively to obtain an optimally amalgamated compound.

[0016] The fire-retardant materials are chosen among phosphorus salts-based compounds. In particular, in the subject example, they comprise tris-monochloro-isopropyl-phosphate, liquid chlorinated phosphate ester and ammonium polyphosphate.

[0017] The solvent used is conveniently coalescent like the methyl and propyl ether of propylene glycol, to favour film formation in emulsified resins, such as the methyl and propyl ether of propylene glycol.

[0018] With respect to the greater or lesser density of the compound, depending on the use whereto it can be destined, a further and subsequent addition of water is envisioned.

[0019] A practical example of embodiment of the subject compound comprises the following exact formulation, obtained after long studies and trials:

- cellulose solution at about 29.7%;
- coalescent solvent (PM/DPM) at about 2%;
- fluid fire-retardant material - the phosphate - (AMGARD TMPC) at about 1.5%;
- water at about 20%;
- stabilised resin at about 20%;
- wood flour at about 16.3%;
- fire-retardant material in powder form - ammonium polyphosphate - at about 2.9%;
- kaolin at about 2%;
- CELITE 281 at about 0.5%.

[0020] To the aforementioned components, subjected to mixing, is added water as necessary (in the case at hand, about 5.15%) mixing for about fifteen minutes at ambient temperature of about 20 degrees.

[0021] The product thus obtained is preferably sprayed (although it could be applied with stopping knife means or spread like filler), with appropriate pumps which collect the compound and compress it under adequate pressure and convey it along hoses with nozzle terminals, for constant flow rate spraying. Such pumps are of the kind produced by TAIVER of Milan (Italy).

[0022] On the surface to be treated, acrylic or polyurethane adhesive, preferably also fire-retardant, is applied beforehand, for a quantity of about 70/120 grams per square metre.

[0023] In the case at hand the choice of adhesive with the aforesaid required characteristics has fallen, in particular, on the acrylic adhesive made by Germany's HENKEL, or on the polyurethane adhesive made by CONCORD of Treviso (Italy).

[0024] Once the liquid part of the layer, or of each layer (with thickness measuring about 0.5 mm and in any case no more than 1 mm) has evaporated, it is convenient to apply filler or insulating material, preferably fire-retardant, of the type normally usable for wood.

[0025] In the case at hand, the one specifically chosen is made by ICA of Civitanova Marche (Italy).

[0026] The subject invention may be subject to modifications or improvements, without thereby departing from the scope of the aforementioned claims.

Claims

1. Fluid compound based on wood flour, for coating, insulating and/or filling surfaces with low compound thickness, characterised in that it comprises at least the following components: wood flour; resin; inert materials; a cellulose solution.

2. Compound according to claim 1, characterised in that it comprises at least the following additional components: fire-retardant materials; solvent.

3. Compound according to claim 2, characterised in that:

   - the wood flour is introduced in a percentage ranging between 15% and 17%;
   - the water is introduced in a percentage ranging between 15% and 25%;
   - the resin is introduced in a percentage ranging between 15% and 25%;
   - the inert materials are introduced in a percentage ranging between 1% and 4%;
   - the cellulose solution is introduced in a percentage ranging between 28% and 33%;
   - the fire-retardant materials are introduced in a percentage ranging between 3.5% and 6%;
   - the solvent is introduced in a percentage ranging between 1% and 3%.

4. Compound according to one of the previous claims, characterised in that the resin is a stabilised vinyl resin.

5. Compound according to claim 4, characterised in that the stabilised vinyl resin is a water dilutable vinyl-acrylic copolymer desiccating in air, with high chlorine content, stabilised in its molecule.

6. Compound according to any one of the previous claims, characterised in that th inert materials comprise at least kaolin and at least a natural mineral charge based on silica, carbonates, magnesium and manganese, obtainable from diatom powder.

7. Compound according to any one of the previous claims, characterised in that the cellulose solution is a solution of water soluble polymers.

8. Compound according to claim 7, characterised in that the polymer solution comprises cellulose ethers.

9. Compound according to any one of the previous claims, characterised in that the fire-retardant materials are chosen among phosphor salts-based compounds.

10. Compound according to claim 9, characterised in that the fire-retardant materials comprise at least:

- tris-monochloro-isopropyl-phosphate, liquid chlorinated ester phosphate;
- ammonium polyphosphate.

11. Compound according to any of the previous claims, characterised in that the solvent is coalescent like the methyl and propyl ether of propylene glycol.

12. Compound according to any one of the previous claims characterised in that the wood flour has grain size ranging between 75 and 150 micron.

13. Compound according to any one of the previous claims, characterised in that it comprises a further addition of water, depending on the use whereto the compound is destined.

14. Method for the application of the compound, characterised in that it comprises the following phases:

- preliminary application, on the surface to be treated, of acrylic or polyurethane adhesive;
- successive application of the compound;
- application of an external filler or insulating agent, after desiccation of the compound.

15. Method according to claim 14, characterised in that the adhesive is of the acrylic type and it is applied in a quantity ranging between 70 and 120 gr/m2.

16. Method according to claim 14, characterised in that the adhesive is of the polyurethane type and it is applied in a quantity ranging between 70 and 120 gr/m2.

17. Method according to claim 15, characterised in that the acrylic adhesive is fire-retardant.

18. Method according to claim 16, characterised in that the filler or insulating agent is fire-retardant.

19. Method according to claim 14, characterised in that the application of the compound is effected by spraying, by means of a suitable pump, in one or more layers, each with a maximum thickness of about 1 mm.

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 98 83 0765

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	WO 80 00256 A (LIVINGSTONE C. D.) 21 February 1980 * page 2, line 8 - line 24 * * page 3, line 5 - line 12 * * page 3, line 28 - page 4, line 2 *	1-5,9, 12,14,19	C08L97/02 C09D197/02 C09D201/00
A	DE 296 04 493 U (COLOR & PAINT MALEREIBETRIEB GMBH) 11 July 1996 * claims *	1,7,8	
A	DE 36 06 167 A (STEINBRICH M.) 27 August 1987 * the whole document *	1,14,19	
A	DD 300 980 A (BAUCHEMIE LEIPZIG GMBH) 17 September 1992 * the whole document *	1,4,12	
A	DE 32 22 416 A (ERLACHER) 15 December 1983 * claims *	1,7,8	
A	FR 2 567 795 A (R. MATHIEU) 24 January 1986 * the whole document *	1,7,13	TECHNICAL FIELDS SEARCHED (Int.Cl.6) C08L C09D
A	CHEMICAL ABSTRACTS, vol. 89, no. 22, 27 November 1978 Columbus, Ohio, US; abstract no. 181436, "coating materials for wallpaper" XP002102203 * abstract * & JP 53 077230 A (INSTITUTE PRODUCTION AND DEVELOPMENT SCIENCE) 8 July 1978	1	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	27 May 1999	Mazet, J-F

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 98 83 0765

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

27-05-1999

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 8000256 A	21-02-1980	GB 1578736 A EP 0015899 A	05-11-1980 01-10-1980
DE 29604493 U	30-05-1996	EP 0792923 A	03-09-1997
DE 3606167 A	27-08-1987	NONE	
DD 300980 A		NONE	
DE 3222416 A	15-12-1983	AT 15682 T EP 0096821 A	15-10-1985 28-12-1983
FR 2567795 A	24-01-1986	NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82